

**INTRODUCTION
TO THE
NATIONAL OCEANOGRAPHIC DATA CENTER**

GENERAL SERIES

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Woods Hole Oceanographic Institution

PUBLICATION G-1

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1963

The National Oceanographic Data Center is sponsored by six government agencies having an interest in the marine environment; it is governed by an Advisory Board composed of representatives of these activities and the National Academy of Sciences. The U. S. Naval Oceanographic Office is assigned responsibility for management of the National Oceanographic Data Center.

The Sponsoring Agencies are:

Atomic Energy Commission
Bureau of Commercial Fisheries
Coast and Geodetic Survey
National Science Foundation
Department of the Navy
Weather Bureau

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NATIONAL OCEANOGRAPHIC DATA CENTER

GENERAL SERIES

INTRODUCTION TO THE NATIONAL OCEANOGRAPHIC DATA CENTER

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Publications in the NODC General Series.

1. Introduction to the National Oceanographic Data Center, NODC
Pub. G-1, 1963
2. Oceanographic Vessels of the World, NODC Pub. G-2, 1961

PREFACE

A new dimension in interagency cooperation within the United States Government is represented by the establishment of the National Oceanographic Data Center (NODC). Its sponsors include those agencies of government having a primary interest in the marine environment; namely, the Department of the Navy, the Coast and Geodetic Survey, the Bureau of Commercial Fisheries, the Weather Bureau, the Atomic Energy Commission, and the National Science Foundation. In addition to providing the funds for operation of the Center, each agency is represented on the National Oceanographic Data Center Advisory Board which determines the operational policies of the Center. The scientific community is represented by two individuals appointed by the National Academy of Sciences.

The spirit of cooperation between agencies has influenced the Data Center's relations with the international scientific community as well. The NODC has fostered exchange programs with many nations; as of January 1962, data exchange with one or more institutions in 18 countries and the International Council for the Exploration of the Sea (ICES) has been inaugurated.

The NODC cordially extends an invitation to all nations, institutions, agencies or individuals who are active in the collection of all types of oceanographic and marine environmental data to participate with us in a reciprocal data collection effort that should prove to be beneficial to all concerned. The Data Center will provide duplicate punch cards or listings of contemporary data taken by institutions in return for data prepared (coded) properly on log sheets provided by NODC. The basic data forms (log sheets) and instructions will be provided on request. All requests for marine environmental data or information and questions concerning oceanographic data processing should be addressed to: Director, National Oceanographic Data Center, Washington 25, D. C.

"... shore facilities are urgently required to provide laboratory space for analysis and interpretation of data and to train new oceanographers

"... An essential part of the shore establishment is the new National Oceanographic Data Center which will begin its first full year of operation in 1962. This Center will make available to the scientific community data collected throughout the world."

President John F. Kennedy, March 29, 1961

TABLE OF CONTENTS

	Page
<i>Preface</i>	iii
<i>Sponsoring Agencies of the NODC</i>	1
<i>The NODC — Its History and Mission</i>	5
<i>In Answer to Your Questions about the NODC</i>	7

Appendix
Marsden Square Chart
One Degree Divisions of
Marsden Squares

The NODC seal which appears on the front cover of this publication symbolizes the contributing agencies and their cooperative effort in extracting information from all oceans of the world.

SPONSORING AGENCIES OF THE NATIONAL OCEANOGRAPHIC DATA CENTER

For more than one hundred years the United States has been acquiring and compiling oceanographic data. Lt. Matthew Fontaine Maury of the United States Navy collected oceanographic and meteorological data from the logs of men-of-war and merchant vessels. He assembled thousands of observations of prevailing winds and currents, ice, icebergs, and other data of value to mariners. Maury compiled and ultimately used these data in constructing his Wind and Current Charts, which were distributed to mariners who would, in turn, cooperate in this endeavor by sending him observations made during their voyages. He early proved the value of acquiring oceanographic data, compiling them, and applying them to a useful end product. His Wind and Current Charts shortened sailing time to California by almost 50 days. Maritime powers throughout the world acclaimed his work. Maury had provided the groundwork for a truly cooperative effort among mariners for their mutual benefit. His work was continued at the U. S. Navy Hydrographic Office and led ultimately to the production of the Pilot Charts.

Many other United States government agencies besides the Navy were also actively engaged in early oceanographic surveying and research. The U. S. Coast and Geodetic Survey carried out and sponsored oceanographic expeditions beginning in 1844 when it started a systematic survey of the Gulf Stream. The Weather Bureau became responsible for collecting meteorological and sea surface temperature data in 1891; the Bureau of Commercial Fisheries collected oceanographic data for years in the pursuit of its biological work and regularly used vessels for surveying; and the Coast Guard, as part of its International Ice Patrol operations, started the survey of northern waters in 1913, shortly after the TITANIC disaster.

Today, these and other government agencies and private institutions find that their oceanographic requirements have been greatly expanded. A brief description of the oceanographic activities of the agencies sponsoring the NODC and the seal of each is presented in the following pages.

Beginning in Fiscal Year 1964, the United States Geological Survey and the United States Coast Guard plan to contribute to the support of the National Oceanographic Data Center. The Geological Survey has been active in investigating marine geological, hydrological, and geophysical properties and processes, including those involving mineral deposits. The Coast Guard has been active in oceanographic work since 1913, primarily through its International Ice Patrol, and has contributed much to our knowledge of the oceanography of northern waters. The oceanographic effort of the Coast Guard will be considerably increased within the next few years pursuant to an amendment of Title 14 of the United States Code which will permit it to expand its functions in oceanography.

We wish to welcome the Geological Survey and Coast Guard to the family of supporters of the NODC.



The Atomic Energy Commission is vitally interested in obtaining, developing, and using oceanographic data in connection with the behavior and effect of radioactive material in the marine environment. The ultimate destination of radioactive fallout on land is the ocean. The ocean itself is a potential area for disposal of atomic wastes, but it cannot be used extensively for this purpose without our knowing more about what will be the ultimate effect on its flora and fauna.



The Bureau of Commercial Fisheries acquires many oceanographic data in the course of its fisheries investigations. Its scientists use these data and those they obtain from other agencies, primarily through the NODC, to understand the marine environment and the factors which affect the fisheries resources of the seas. These data are also used in the development of fishing forecasting techniques both to improve the domestic sea fisheries potential and to aid underdeveloped nations through such international agencies as the Food and Agriculture Organization (FAO) of the United Nations in advancing their economy by utilization of these ocean resources.



One of the major oceanographic efforts of the Coast and Geodetic Survey is dedicated toward carrying out its assigned portion of the National Academy of Sciences ocean-wide survey program. In addition, comprehensive oceanographic programs are carried out on all Coast and Geodetic Survey hydrographic survey ships during normal coastal survey operations in order to acquire basic information on the oceanographic characteristics of our nearshore environment. All of these oceanographic data are submitted to the National Oceanographic Data Center.



The Department of the Navy, represented by the U. S. Naval Oceanographic Office, the Office of Naval Research, and other departmental components, is the largest financial contributor and is responsible for the management and support of the Data Center.

The U. S. Naval Oceanographic Office, the largest governmental oceanographic agency, has had an expanding program in oceanographic data collection and oceanographic research since World War II. It has pioneered in the development of oceanographic prediction methods. The data which had been processed by the Oceanographic Office were contributed to form the nucleus of the Data Center's collection.

The oceanographic program of the Office of Naval Research consists of numerous basic and applied research projects largely carried out by contract with universities and nonprofit organizations.

More than 16 ocean-going research ships and numerous coastal vessels are employed in these projects which contribute data to the NODC and draw heavily on its facilities.



The National Science Foundation supports oceanographic research at civilian oceanographic institutions. This research cannot be carried on properly without the benefit of all the available oceanographic data relating to their particular problems. They are able to obtain from the National Oceanographic Data Center, in a suitably processed form, data that enables them to carry out their research expeditiously and in larger volumes than ever heretofore available for determining the environmental interrelationships. The data from the International Indian Ocean Expedition (IIOE), which is coordinated in the United States by the National Science Foundation, will be processed by the National Oceanographic Data Center.



WEATHER BUREAU

The Weather Bureau has a similar repository for meteorological data at its National Weather Records Center in Asheville, North Carolina, which contains, along with the meteorological data, many surface water temperature and sea and swell data. The relation of the collections of the data in these two centers is close, because at the ocean interface, the ocean of air and the ocean of water exert profound influences on each other. The surface water temperature data and the marine meteorological data must go hand in hand.

THE NODC — ITS HISTORY AND MISSION

Scientists of the United States recognized the need for a centralized National repository for oceanographic data where the data would be available for everyone desiring to use them. Approximately three years ago, formal action was begun to establish such a facility. At about the same time, members of Congress wished the Nation to have this capability to enhance its scientific research and defense potential, and introduced bills in the 86th Congress to establish a National Oceanographic Data Center.

In April, 1959, the Working Group on Data Recording and Standardization of the Coordinating Committee on Oceanography reported on the needs for an oceanographic data center and the means by which it should be established. Acting on this report, the Interagency Committee on Oceanography (ICO) recommended to the Federal Council for Science and Technology that the National Oceanographic Data Center be established and be sponsored, financed, and its policies determined jointly by the Navy, the U. S. Coast and Geodetic Survey, the Bureau of Commercial Fisheries, the National Science Foundation, and the Atomic Energy Commission. These recommendations were approved unanimously by the Federal Council on June 28, 1960.

On July 8, The Honorable James H. Wakelin, Jr., took the first steps to implement the Data Center, requesting the Chief of Naval Operations and the Hydrographer to undertake this new responsibility. On July 19, the Chief of Naval Operations directed the Hydrographer "... to establish at the earliest practical date a National Oceanographic Data Center." NODC was established as an administrative component of the Hydrographic Office on November 1, 1960, and the Interagency Agreement was signed by the Secretaries of Commerce, Navy, and Interior, and the Director of the NSF and the Chairman of the Atomic Energy Commission on 23rd of December 1960.

The oceanographic data holdings of the Hydrographic Office, consisting of more than 20 million machine punch cards, data logs, reports, and other forms were also contributed.

The significance of the establishment of the Data Center was expressed by President John F. Kennedy in his Executive Communication #734 of March 29, 1961, when discussing the need for an accelerated program in oceanography, he stated the following:

"... shore facilities are urgently required to provide laboratory space for analysis and interpretation of data and to train new oceanographers.

"... An essential part of the shore establishment is the new National Oceanographic Data Center which will begin its first full year of operation in 1962. This Center will make available to the scientific community data collected throughout the world."

In this communication the President also mentioned the need for 10 new oceanographic vessels to add to the present United States oceanographic fleet. When these ships become operative they will contribute vast amounts of marine environmental data to our already voluminous archives.

The National Oceanographic Data Center is managed in accordance with policies and procedures determined by an Interagency Advisory Board. The Interagency Advisory Board which determines the policies of the Data Center and guides its scientific operation consists of representatives from each of the supporting agencies plus two representatives selected by the National Academy of Sciences. The board members make up what is probably one of the most informed groups on the Nation's oceanographic activities.

The Data Center was established to function as a service activity for the Nation's scientific community with respect to marine environmental data and information requirements. These data are now easily accessible to the public for use free of charge at the NODC, or copies of the data may be obtained at cost.

The NODC is primarily a central repository for the Nation's oceanographic data. Part of its mission is: to receive, compile, process, and preserve oceanographic data for rapid retrieval; establish procedures for insuring that the accuracy and general quality of the incorporated data meet the criteria established by the Advisory Board, and prepare data summaries, tabulations, and atlases showing annual, seasonal, and monthly oceanographic conditions.

In answer to your questions about NODC

..... what data are available?

PHYSICAL - CHEMICAL DATA

Bathythermograph Data

Enlarged reproductions of composited BT slide and grid show temperature traces to a maximum of 900 feet. Related meteorological and surface environmental data also given.

Volume—about 800,000 prints from all oceans.

Oceanographic Station Data

These give values of water temperature, salinity, other water chemistry (when available)—oxygen, pH, silicate, phosphate, nitrite, nitrate, and alkalinity—at the observed depths. These values, and specific volume anomaly and dynamic depth anomaly, also given at all International Standard Depths (only oxygen for other water chemistry). Surface environmental data also given.

Volume—about 200,000 stations from all oceans.

Surface Data

Primarily data from the H1-9 (Current Report) and summaries from some foreign and domestic marine decks. These contain sea surface temperature, sea, swell, related meteorological data and currents. These data are not processed by NODC at present; however processed data from the former Hydrographic Office collection are available.

GEOLOGICAL - GEOPHYSICAL DATA

Some published reports in this category currently available at NODC. Practically any report can be obtained and reproduced from sources in the Washington, D. C. area. Holding—recall system for these data currently under development by NODC.

BIOLOGICAL DATA

Holding—recall system for these data currently under development by NODC. Practically any report can be obtained and reproduced from sources in the Washington, D. C. area.

how are the data available?

PUNCH CARDS

Duplicate punch cards of any part of the entire collection of Oceanographic Station Data may be obtained from the National Oceanographic Data Center. These are ordinarily available by cruises which are referenced by number in NODC Publication C-1, Reference Sources for Oceanographic Station Data.

A limited volume of Keypunched BT Data giving temperatures at certain International Standard Depths in the North Atlantic Ocean is available. Duplicate punch cards from this deck may be obtained.

Duplicate punch cards may be made from Sea and Swell Recap cards of the National Weather Records Center (NWRC), Current Summaries from H1-9, and Sea Surface Temperature Summaries from H1-9 and NWRC.

PRINTOUTS

Machine printouts (listings) may be made from all cards and magnetic tapes on file at NODC. As standard policy, printouts accompany all duplicated punch cards. With the exception of Geographic Sorts, all Oceanographic Station Data are provided as individual cruises. Data can be printed out on a special publication listing paper which may be used directly for reproduction by photo-offset methods. Samples of this paper are provided on request.

OZALID PRINTS

Analog prints of the BT records are available on 3" X 5" ozalid cards with the trace and grid reproduced on one side and identifying information and some environmental information on the reverse.

OTHERS

Reproduction of archive copies of machine printouts for which cards are no longer available may be made by ozalid process or photostat, whichever method the NODC decides will give the best reproduction.

Reproduction of publications or parts of publications (non-copyrighted) will be made by photostat or direct reproduction methods.

..... how can I obtain data?

Requests for data should be addressed to DIRECTOR, NATIONAL OCEANOGRAPHIC DATA CENTER, WASHINGTON 25, D. C. The request should contain: (1) specific type of data desired, (2) the limits of the geographic area, and (3) any other pertinent information which will assist in defining the request. In regard to geographic area it would be best to specify the area by Marsden squares (see Appendix), although definitions by latitude and longitude will be acceptable. An estimate of the cost and approximate delivery date will be provided by letter. Work on the request will begin on receipt of a check or money order made payable to the National Oceanographic Data Center (or for Federal activities, the proper form authorizing transfer of funds). Arrangements can be made to maintain a fund or working account at the NODC from which work costs could be extracted. A fund of this type can be established upon request.

..... what will be the cost?

The cost for obtaining data will be determined primarily by the nature of the request and will be based on such criteria as the number of observations involved, special analyses required, computer or EAM rentals, materials required, etc. The most economical means will be used to provide the data. If you wish to use data at the NODC, study rooms will be provided. There is no charge for the use of study rooms or the data (except, perhaps, for computer or EAM rental) at NODC. Advance notification is requested to reserve a study room and it is advisable to indicate, in advance, the type of data and geographic areas of coverage required for study.

..... what is the machine processing capability of NODC?

The NODC's Automatic Data Processing (ADP) facilities include both Electric Accounting Machine (EAM) equipment and a high speed computer system. The EAM equipment is located physically at NODC and consists of card punching machines, a card verifier, a sorter, a collator, a tabulator, and a card reproducing machine. The NODC is therefore well equipped for performing "in house" the non-computational phases of machine data processing. All computational work is done using a high speed IBM 1401/7070 computer system, which is currently housed at the U. S. Naval Oceanographic Office.

what publications are available?

The NODC publishes a General Series, a Catalog Series, and a Manual Series. Those currently available are:

Publication G-2, Vol. I, Oceanographic Vessels of the World.

Publication C-1, Reference Sources for Oceanographic Station Data (Provisional)

Publication M-1, Conversion Tables, for Use by the International Indian Ocean Expedition

Publication M-2, Processing Physical and Chemical Data from Oceanographic Stations

The following publications are currently in work:

Publication G-2, Vol. II, Oceanographic Vessels of the World

Publication C-4, Catalog of Oceanographic Data, Indian Ocean

Publication C-5, Catalog of Oceanographic Data, North Pacific Ocean

The following publications were issued originally under another series but are now out of print:

Publication C-2, Catalog of BT Data, World Wide (Appeared originally as SP-12, Pt. II a, Inventory of Oceanographic Data, North Atlantic Ocean)

Publication C-3, Catalog of Oceanographic Data, North Atlantic Ocean (Appeared originally as SP-12, Pt. II b, Inventory of Oceanographic Data, North Atlantic Ocean)

can I exchange data with the NODC?

Under its charter the NODC is responsible for "acquiring by exchange, gift or purchase oceanographic data of scientific value from domestic or foreign sources." The NODC now has working exchange arrangements with activities in 18 foreign nations, the International Council for the Exploration of the Sea, and the International Indian Ocean Expedition.

Data may be exchanged with the NODC in two ways:

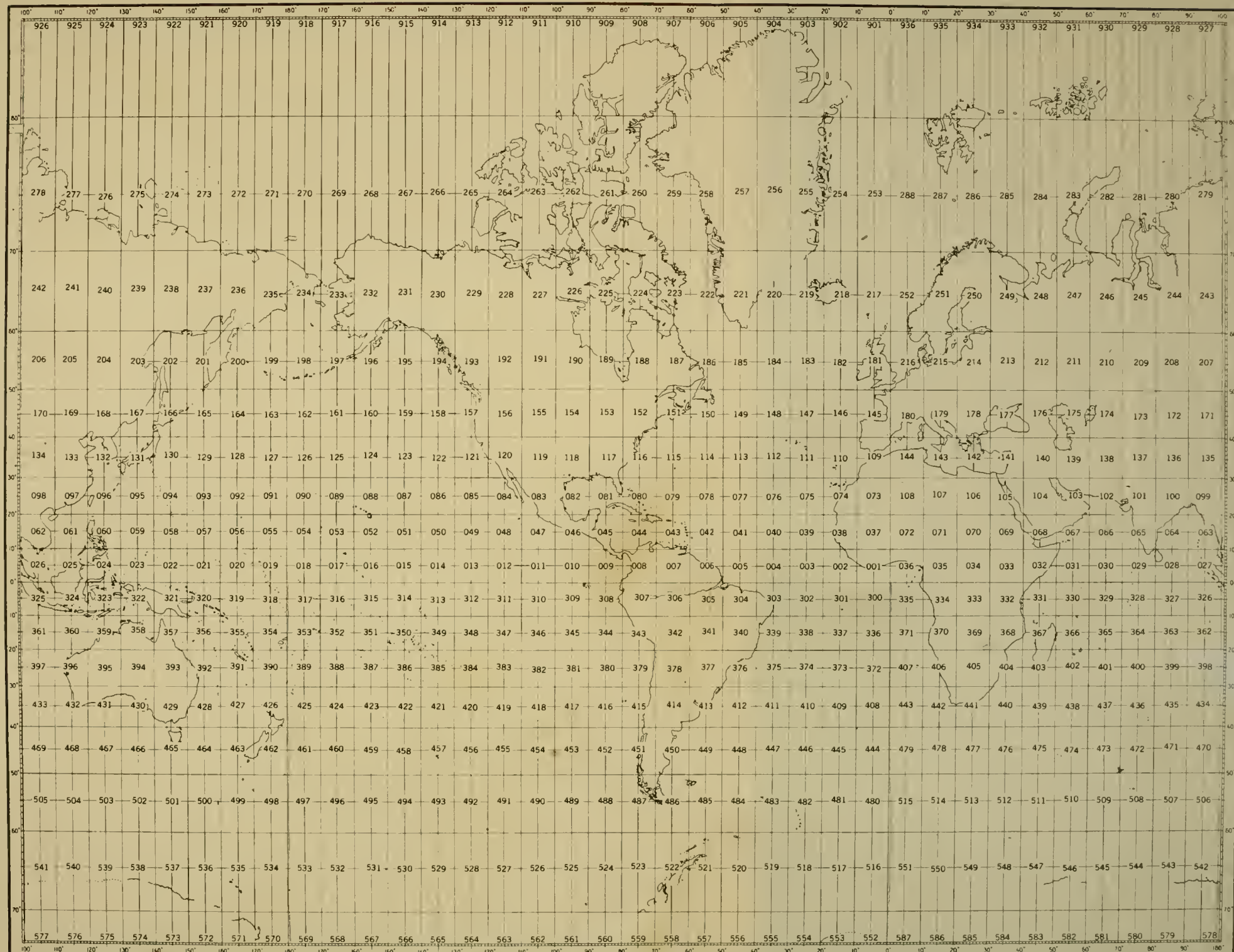
(1) For contemporary data, the NODC will process contributed data, preferably coded on NODC forms according to NODC procedures, and provide final listings or duplicate punch cards in exchange for the data. Bathythermograph slides will be processed by NODC standard procedures and copies of the final BT prints will be provided to the contributor. Basic NODC data forms (log sheets) and instructions are available on request.

(2) For historical data or information (publications, reports, atlases, etc.) the NODC will exchange original or reproduced material in exchange for information of like kind.

Participants in exchange arrangements may delineate specific areas for which they require information. The NODC, on the other hand, has no geographic limits and will accept data or information from all oceans, seas, or estuaries.

We extend an invitation to all nations and to all institutions, corporations and individuals, both within and outside the United States, to exchange oceanographic data and information of all types with us, and we welcome the opportunity to be of service.

APPENDIX



MARSDEN SQUARE CHART

